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Bicycle trails

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MASTER PLAN
of
COUNTYWIDE BIKEWAYS
FOR
ORANGE COUNTY
AMENDMENT NO.4

AN ORANGE COUNTY PLANNING DEPARTMENT REPORT

Adopted March 20, 1974

County of Orange, C.
Traffic Bicycles

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1 PURPOSE

A countywide plan for bikeways was established September 29, 1971, when the Board of Supervisors unanimously adopted the recommendations contained within the report titled, *A Feasibility Study of a Countywide Bicycle System in Orange County*. This document, *The Master Plan of Countywide Bikeways*, has as its purpose:

Incorporating additional bikeways into the countywide system,

Presenting additional recommendations regarding funding and administration,

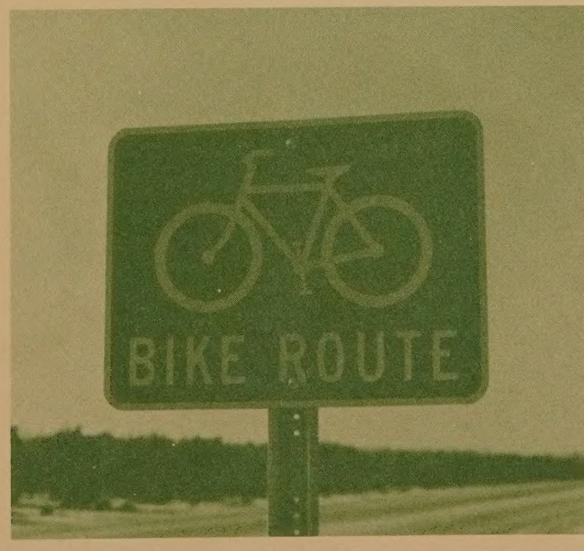
Establishing standards and criteria as guidelines for bikeway design and construction,

Reporting the status of the implementation of the bikeway system in Orange County,

Documenting the County's fund matching activities for bicycle facilities,

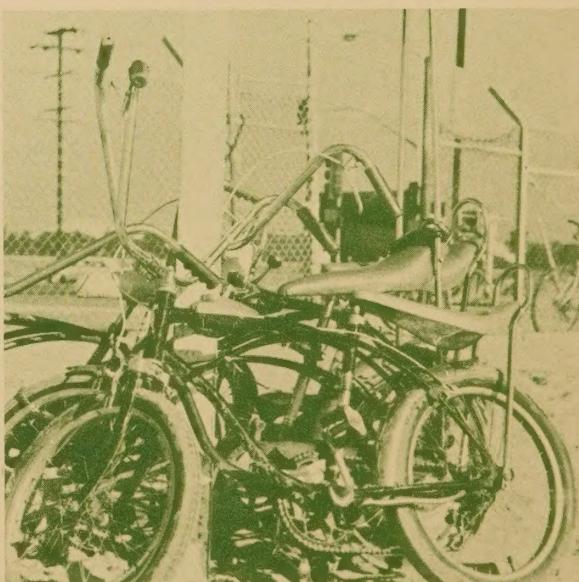
Sharing the research and experience of the County with the cities,

Providing government officials and citizens a basis for decision making and an understanding of the County's commitment to the creation of the countywide bikeway system.



2 RECOMMENDATIONS

1. Adopt this report as amendment number five to the Master Plan of Countywide Bikeways.
2. Indicate intent to allocate \$400,000 from Harbors, Beaches and Parks District funds and/or County general funds beginning in fiscal year 1974-75, subject to budgetary limitations, for continued implementation of the Master Plan of Countywide Bikeways; vest the Harbors, Beaches and Parks District with the responsibility for the administration of this allocation and continued implementation of the Master Plan.
3. Continue to match funds up to 50% with the cities to implement the Master Plan.
4. Direct the Road Department and the Flood Control District to continue budgeting funds to implement the Master Plan within Road and Flood Control rights-of-way.
5. Direct the Road and Planning Departments to develop a plan of local bicycle trails in the unincorporated area of the County.
6. Require all Planned Community Districts to include within their Recreation and Circulation Elements a provision for local bikeways which will be coordinated with and act in support of the Master Plan of Countywide Bikeways.
7. Request the Orange County Transit District, in cooperation with the Planning and Road Departments, to study the feasibility of a mixed mode transportation system that would provide, where appropriate, bicycle routes to transit terminals, carrying facilities for bicycles on public transportation vehicles, and bicycle storage facilities.



3 HISTORICAL BACKGROUND



(IF GRANDPA
COULD ONLY SEE
MY 10 SPEED,
ULTRA-LITE,
CHROME-
MOLYBDENUM...)

In the nearly-forgotten past, before the age of pollution, both in Europe and America many people rode bicycles. Street lighting, highway signs, "carriage rights" for bicycles, many road improvement projects, and countless miles of new roads were largely the result of battles waged by early bicycle clubs to attain these facilities. The Pasadena Freeway for example, follows the route of a nineteenth century "cycle path"! Then, in the bicycle repair shop of Charles and Frank Duryea, the first American car was fabricated. Within a few years the novelty of the rattling, sputtering tin lizzie had taken over. The time was ripe for the rapid acceptance of the

car; even the roads, for which bicyclists had fought so hard, were readily adaptable to the new mode of transportation. The bicycle all but disappeared in the United States, and the Model T soon gave way to the ubiquitous collection of styles and colors that are a way of life today.

While it may seem to provide a fairly reliable and convenient mode of transportation, the automobile has also become one of the major problems of the current decade. As per-capita ownership approaches one car for every resident in some areas, even the most farsighted and modern highway systems are strained to their limits. And few people

find the vast acreages of concrete very aesthetic. Urban parking is both expensive and increasingly scarce. The internal combustion engine, even with its newest refinements, still contributes by far the greatest share to air pollution in urban areas. Encapsulated and insulated in his automobile, man's awareness of his planet's natural environment is dulled; a feeling of community with other members of the biosphere is blocked. And with this ever-increasing dependency on the automobile, as well as escalators, golf carts, and snowmobiles, what is to become of man's legs?

In the last decade, and particularly in the past three years, an increasing number of persons have felt the weight of creeping car-slavery. More voices have joined the plea for improved mass transit systems, increasingly heeded by slow, but meaningful response. Environmental awareness is being nudged into environmental action by countless dedicated citizens. Among the many issues, the increased use of bicycles for transportation, exercise, and non-polluting recreation is one of the most widespread and least controversial of all the issues. In response to this increased interest, and to the inherent desirability of such an alternative transportation/recreation system, many agencies, municipalities, states and the federal government have become involved.



Since about 1960 the basically nineteenth century "safety bicycle" design has seen dramatic improvements, enabling almost anyone today to buy a lightweight, fast and variously geared machine capable of much

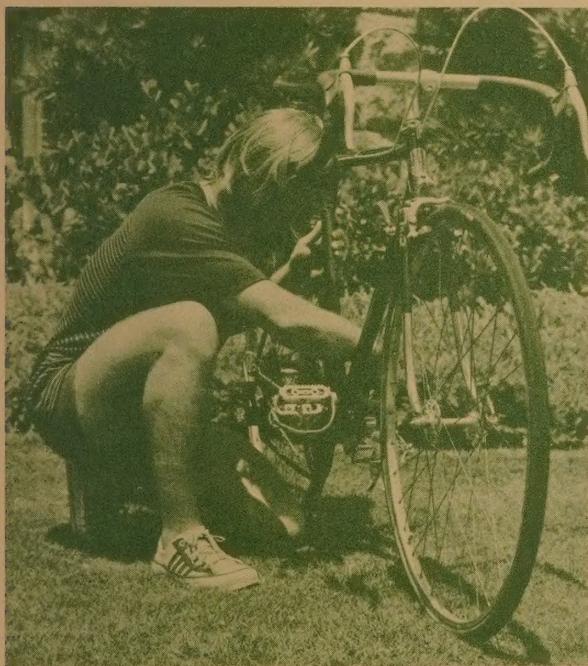
more efficient travel than its balloon-tired, single-speed father. With the advent of the multi-speed bicycle which can cope with hills and easily averaged 10 mph or better on level ground for long periods of time, the feasibility of the bicycle becoming a significant mode of transport has increased even more.



The greatest single problem facing a burgeoning bicyclist population is where to safely and conveniently pursue their pedaling. The competition for transportation space is acute; but there are solutions. One of the more noteworthy answers lies in the development of a planned system of bicycle routes. The routes may involve only signs placed along certain streets; or the system could utilize separate grades or rights-of-way; or it could be any combination of designs which results in an improved, safe, and user-accepted facility. Ultimately, neither a transportation function, nor a strictly recreational one is likely to be distinguished. Instead, the various networks, each based on some particular rationale, will be linked to all other networks, thus the system-complete will satisfy both a recreational and transportation function. This is a new challenge -- one with little precedent -- but one which merits careful, continuing study, sound analysis and timely implementation.

4 NEEDS AND OBJECTIVES

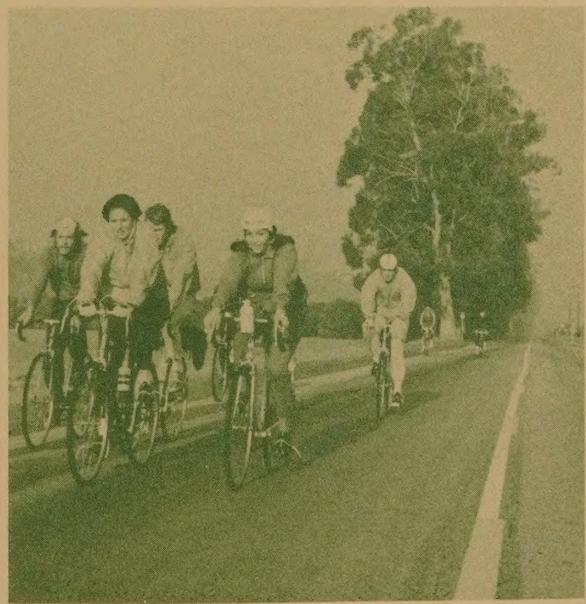
(WELL, IT'LL NEVER HAVE AN AUTOMATIC TRANSMISSION . . .)



Over 10 million bicycles were sold in the United States in 1972. California residents accounted for approximately 1.5 million of these sales. More bicycles than cars will be bought by Californians this year! It is estimated that at least one out of three residents of Orange County owns a bicycle. Data for some communities in the County show up to an average of 1.8 bicycles per household. What all this adds up to is a lot of bicycles - over 500,000 - in Orange County. Obviously more people are bicycling now than ever before. The major reasons given in most surveys relate to three general desires: physical exercise, environmental quality, and economic advantage. Concurrent with the increasing interest in bicycling, there has been a significant upward shift in the average age of the participants. This could account for a similar shift from the largely recreational orientation of the bicyclist, to an expanding interest in the bicycle as a viable

mode of transportation.

From a civic viewpoint, bicycle-use can provide a valuable element for community planning programs by allowing for greater maximization of land use, relief of traffic congestion, and decreasing air and noise pollution. It is a stated desire of the various County departments to reduce dependence on the automobile in Orange County. To this end, facilitating bicycle-use is deemed an important goal.



A recent study (1972) at UCI strongly stresses the incompatability of automobiles and bicycles when competing for the same transportation space. Over half of the respondents in a survey of bicyclists and motorists indicated that the bicycle versus car conflict poses a most serious safety problem. This contention is supported by data from the city of Newport Beach which shows a quadrupling of bicycle-motor vehicle accidents between 1969 and 1971, with 100 accidents occurring in 1971! The National Safety Council reported a 78%

increase for the 1960-1970 decade in bicycle-motor vehicle accidents. This represented the highest increase in any single accident category.

In Los Angeles County in a recent 28 month period, 2,817 accidents involving bicycles and motor vehicles were reported. Of these, nearly 90% resulted in injury of some kind to the bicyclist. Surprisingly, perhaps, 55.3% of the mishaps occurred in residential areas and 42.4% in business districts; about a quarter of all accidents occurred within intersections, and only 1 1/2% in open areas. During the bicycle-automobile confrontation, the bicyclist, as one would expect, is generally the biggest loser.

While data is scarce, studies in several European countries strongly indicate that almost any type of bicycle riding facility lessens the bicycle-automobile accident incidence. This is an easy presumption to accept. The relative merit of various designs is a subject for study and is taken up in a later chapter. The fact that a definite need exists for a comprehensive plan to facilitate a rapidly increasing bicyclist population is difficult to refute.



5 ORANGE COUNTY GOES BICYCLING

(GEARED TO GO - RAMBLIN')



Motivated by the notable and well-documented increase in bicycling interest, the Orange County Planning Department in 1967 considered the inclusion of certain recreational bicycle route plans in the Master Plan of Hiking and Riding Trails. However, due to a change of priorities, the project was not undertaken at that time. Interest continued to wax and in 1971 proposals for local bicycle facilities were received from the Orange Park Association and the University Park Area Citizens, two interested citizen groups. The Board of Supervisors at this time directed the Planning Department and the Road Department to study the two proposals and to extend the study to encompass the countywide recreational aspects of bicycling and to explore possible bicycle routes in the County.

The Planning Department chose to channel its efforts towards developing a proposed countywide bicycle route system. A countywide approach was chosen in favor of a fragmented, piecemeal local development plan. The chosen strategy would provide an equitable distribution of County

effort and better facilitate a functional marriage to the County's regional recreation and transportation plans. The report was completed in July, 1971, and after public hearings before the Planning Commission and the Board of Supervisors, the report, *Bicycle Trails - A Feasibility Study of a Countywide Bicycle System in Orange County*, was adopted in September, 1971. As well as identifying a skeletal system of potential bicycle routes of countywide significance, the report proposed policy and recommended courses of action. Implementation received a major thrust when the Board authorized \$100,000 for immediate construction of bikeways. Since the adoption of the original plan, three amendments have been added. Each of these amendments have facilitated the addition of certain potential routes not in the original plan but which have been determined to be of countywide significance. The first two amendments established important precedents in the implementation phase of the new bicycle plan. The first, a transaction between the County and the city of Huntington Beach, provided matching funds to

the city for development of a route of countywide significance linking the proposed Santa Ana River trail with the beach. The second amendment demonstrated the cooperation possible between the County and private development interests with respect to a shared planning objective. It affected the addition of several segments of important proposed bicycle routes in Laguna Niguel to the countywide plan. Amendment number three added 17.8 miles of trails located in six cities in order that they might receive Revenue Sharing funds which were distributed through the Harbors, Beaches and Parks District. This report, taking the form of both update and addition, will propose further expansion of the original system.



Cooperation among the Planning and Road Departments, and the Harbors, Beaches and Parks District resulted in a valuable synthesis of knowledge and experience and has allowed considerable progress toward developing a functional countywide system of bicycle routes. It is the intent of this report to present - based on the original report, its amendments, and subsequently acquired knowledge and experience - a Master Plan of Countywide Bikeways.

6 THE BIKEWAY SYSTEM ("EAST SIDE, WEST SIDE, ALL AROUND THE TOWN")

The outlook of the original feasibility study for a County bicycle system was basically conceptual. The primary goal was to identify a potential system of feasible bicycle routes, and to suggest general priorities for implementation. Although little time has elapsed since this first publication, several changes have already been adopted and others are being proposed. The steady and increasing flow of communication among interested agencies and groups strongly suggests a continuing modification and tailoring of the skeletal plan.

The regional bicycle plan proposes three integrated networks of bikeways¹: countywide recreation-oriented routes that would link and traverse recreation and open space areas; countywide transportation routes to recreation areas and other destination points of significance; and routes on a local community scale. All three networks recognize that recreation and transportation functions are interrelated. More than 70% of the proposed recreational route mileage traverses unincorporated areas, while just less than half of the transportation network lies outside the cities.

The proposed plan is modular, with each of the three networks manifesting a different level of effectiveness. The networks are regarded as elements of a total complex which should include all of them, but implementation of any single route is not dependent upon completion of the larger systems of which it is a part. Combining all of the networks, however, would certainly represent the greatest potential for countywide participation.

RECREATIONAL

The predominantly recreation oriented network identifies potential routes to and through seven regional parks. It also prescribes routes to the beaches adjacent to the cities of Seal Beach, Huntington Beach, Newport Beach, Laguna Beach, and San

Clemente. These routes were selected on the basis of providing the most pleasurable recreational experience while traversing them.

TRANSPORTATION

The primary feature of routes identified in the transportation oriented network is to provide links to recreation areas, educational centers, communities, and to existing and proposed local bicycle systems. Eleven higher educational facilities and all of the 26 cities throughout the County would be served by these proposed routes. Bicyclists could also travel safely to Disneyland, Knott's Berry Farm, other special recreation areas, and many local parks.

PROGRESS

Although about 33 miles of bikeway have been completed in the unincorporated County, only a few miles of the proposed countywide system have been implemented. The completed routes, largely bicycle ways, are primarily interim routes, or feeder routes, for the proposed system. An evaluation system for assigning implementation priorities for proposed routes in the unincorporated County is presently being developed by the Road and Planning Departments, and the Harbors, Beaches and Parks District. It is important that these implementation priorities be extended to include countywide routes within the cities. The formulation of a five-year development

¹ Bikeway: Any facility that explicitly provides for bicycle travel, from a signed street to a fully separated trail. Including: Bicycle way - provides no physical separation from motor vehicle traffic; Bicycle trail - provides physical separation from motor vehicle traffic (not including striping).

CITY BIKEWAY PLANS AND FACILITIES

FIGURE 1

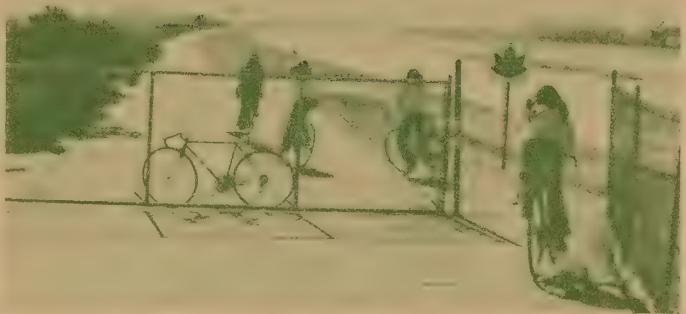
	PLANS		FACILITIES			
	Existing Plans	Being Prepared	Existing		Proposed	
			Trails	Ways	Trails	Ways
ANAHEIM	None	None	None	None	None	None
BREA	Yes	Yes	0.30	11.5	6.45	10.53
BUENA PARK	Yes	Yes	0.13	4.87	4.87	18.67
COSTA MESA	Yes	None	None	2.90	None	None
CYPRESS	Yes	Yes	4.25	None	14.85	16.13
FOUNTAIN VALLEY	None	Yes	None	None	1.90	13.00
FULLERTON	Yes	Yes	0.40	3.90	11.48	27.59
GARDEN GROVE	Yes	None	None	11.18	None	None
HUNTINGTON BCH.	Yes	Yes	None	4.26	5.00	28.24
IRVINE	Yes	Yes	8.30	2.90	15.00	None
LAGUNA BEACH	None	None	None	None	None	None
LA HABRA	Yes	Yes	None	6.75	0.75	6.67
LA PALMA	None	Yes	None	None	None	10.22
LOS ALAMITOS	None	None	None	None	None	None
NEWPORT BEACH	Yes	Yes	10.73	5.12	19.27	49.88
ORANGE	Yes	Yes	2.64	18.00	4.00	6.00
PLACENTIA	Yes	Yes	None	0.12	None	23.29
SAN CLEMENTE	Yes	Yes	None	1.75	None	4.9
SAN JUAN CAP.	Yes	Yes	0.49	1.72	None	3.93
SANTA ANA	Yes	Yes	None	3.70	None	12.0
SEAL BEACH	Yes	Yes	None	5.10	9.25	7.50
STANTON	None	None	None	None	None	None
TUSTIN	None	Yes	None	None	None	41.47
VILLA PARK	Yes	Yes	None	3.52	0.56	4.40
WESTMINSTER	Yes	Yes	None	3.63	7.42	22.51
YORBA LINDA	Yes	Yes	None	1.01	None	20.62

plan is recommended which should reflect city development plans and fiscal capabilities.

Very likely the most important bikeway project, though only covering about 14 miles, was the completion of a portion of the Santa Ana River Bicycle Trail from Katella Avenue in Anaheim to the Pacific Coast Highway in Huntington Beach. This project was entirely funded by the County and provides a safe bikeway to the beach for thousands of people. Traffic counts in a single 24-hour period during the Summer of 1972 registered over 5,000 users of the trail. The wide, asphalt path will eventually cross the entire County.

"ON THE TRAIL"

Typical Scenes Along The Santa Ana River Trail To The Beach.



BIKEWAYS OF LOCAL SIGNIFICANCE

The planning of this important element of the total system is most suitably the responsibility of city agencies who are in touch with local needs and desires. Furthermore, the scale of such a community bicycle system does not lend itself to the largely conceptual presentation undertaken here. Such route systems, however, should offer safe bicycle access to schools, shopping centers, recreation facilities, and should provide routes for local commuting, particularly in low income residential areas. Establishment of community bicycle routes that would link unique historical, scenic, or recreational sites would provide not only local recreation, but could also serve to enhance the regional system and vice-versa. Such potential for local routes exists quite notably in the vicinity of Upper Newport Bay, with its aesthetic estuarine character, and in the Capistrano Valley where numerous historical and recreational sites could be linked. In both of these cases, more than one community could be served by the same system; and therefore, a cooperative planning effort among several cities might be indicated. For example, in 1968 the cities of Newport Beach and Costa Mesa cooperated in the development of a Harbor Area Master Plan of Bicycle Trails. Intercity cooperation will also be an important factor in determining the countywide continuity of





the local modules. While the regionally significant intercity routes are generally embodied in the countywide plan, numerous other local route plans will need coordination to avoid incongruity at city boundaries. General cooperation among cities and County departments can also serve to standardize certain aspects of the bikeway facilities throughout the County. At the time of publication of the original

feasibility study (June 1971), only six of the 26 cities had master plans for bikeways, and only four cities had any existing facilities. Presently 20 cities have developed bikeway plans and nine cities have existing facilities. A recent survey indicates that all the cities have reached some phase of consideration of bikeway facilities, and all have either existing or proposed facilities. (Figure 1).

In addition to local networks within the cities, routes of local significance in the unincorporated County have received considerable attention. While no formal plan has guided this development, many miles of useful routes have been signed and striped and should provide interim bikeways until the proposed system is implemented, and perhaps provide valuable feeder routes after the countywide system becomes functional. Nearly all of the 33 miles of bikeway completed at present in the unincorporated County are in this category.

CHANGES IN THE BIKEWAY SYSTEM

Since the adoption of Amendment Number Three, which enlarged the countywide system by adding several routes, continuing evaluation of the plan by the appropriate agencies and jurisdictions had determined that several new additions and modifications would further strengthen the ultimate system. All changes to the adopted plan are reflected on the accompanying map and route index. The most significant additions are described below.

One major change is the addition of several rather extensive routes in the unincorporated southwestern County (Map IV). The longest of the additions follows the proposed route of Canada Gobernadora Road from O'Neill Regional Park to Cristianitos Canyon Road and on to El Camino Real. The southernmost portion of this route is in San Diego County. In conjunction with the Pacific Coast Highway, Laguna Canyon and El Toro Road, this route would complete a major loop, or module, in the countywide system. Moreover, the Gobernadora route would provide access to the sea and estab-

lish a link with the Ortega Scenic Highway planned bikeway and the six proposed regional parks along the Ortega route. The proposed Canada Gobernadora Road is part of the County Scenic Highways Plan, and easily conforms with pertinent bicycle route selection criteria.

With the addition of the Oso Parkway route between Laguna Canyon and the Canada Gobernadora Road, the large triangular module would be dissected into two smaller loops, thereby enlarging considerably the service area of the entire system. The developing population centers of Mission Viejo, Laguna Niguel, and other planned communities would be linked to a variety of recreational facilities, open space areas, and the sea. The Oso Parkway route would also allow traversal of the San Diego Freeway, a formidable barrier to non-motorized traffic. Along with the Canada Gobernadora route, Oso Parkway is a County proposed scenic highway. The Road Department has already implemented a portion of this bikeway between Marguerite and the San Diego Freeway as an interim bikeway.

The southern portion of La Paz Road has already been adopted as part of the countywide bikeway plan. By extending the route along La Paz to Marguerite Parkway an obvious loop can be completed and linkage established between the residential environs of the Mission Viejo planned community and Laguna Niguel, the Aliso Creek Canyon, and the beach at South Laguna. As with the two previously proposed bikeways, La Paz Road is included in the Scenic Highways Plan.

The remaining proposed changes are a collection of generally minor route modifications. These were derived at the suggestion of several cities and were reviewed and approved by interdepartmental staff. The changes are largely designed to enhance the system either by creating a new network module or by providing a more desirable - safer, more direct, more users, etc. - alternative to a present route segment. Even while certain routes may be added or modified, the primary concepts of modularity and countywide significance remain unchanged.

One change avoids the congestion of Lincoln Avenue by taking a less direct route to Santiago Boulevard from the north. The Taft Avenue addition replaces the proposed bikeway along the Southern Pacific Railroad right-of-way. The implementation of a bikeway along the railroad would very likely cause crowding of the riding and hiking trails also proposed along this right-of-way for which no alternative routes exist. Another change deletes the Serrano Avenue and Lemon Street route to Villa Park Road and Santiago Creek in favor of the more direct route along Santiago Boulevard and Villa Park Road. The final change adopts a route selected by the city of Orange along Cambridge Street from Santiago Creek to the countywide route on Collins Avenue. This addition deletes the previously adopted route following Grand Street, Palm Avenue, and Lincoln Street to Collins Avenue. All these proposed changes are merely improvements over previously designated routes, serving the same purpose, and representing no change in the concept of the bikeway plan.

PHYSICAL LOCATION

Road rights-of-way are the most frequently utilized bikeway locations reflected in the County plan. While some facilities are planned for abandoned railroad rights-of-way, and utility and flood control properties and rights-of-way, existing and proposed roads are generally recommended because of relatively easy adaptation for bicycle use, and because of the inherent function of roads in providing a transportation facility. However, the desirability of separating bicycle and motor vehicle traffic cannot be overstressed. Fortunately it is possible to accomplish this even while sharing the same right-of-way. Joint use of the traveled road for short sections may also be practical depending upon traffic speed and volume. Transportation corridors (proposed and existing freeways) have been identified as potential routes. Though immediate implementation is generally unfeasible, future development of freeway bikeways in the adjacent parkway areas parallel to the traffic lanes is a planning concept supported by state and federal agencies.

The subject of bikeway location possibilities is more fully discussed in later chapters concerning route selection and development opportunities.



RESPONSIBILITIES

Insofar as bikeways are concerned, there is no single agency with the responsibility (in the fullest sense) for the coordination and implementation of either countywide or local bikeways. A countywide route plan exists, and considerable funding has been made available for bikeways; but who is to administer the plan, distribute the funds, and by what system of allocation has not been defined.

In the incorporated area, the 26 cities have primary responsibility for any bicycle system within their boundaries. The County is responsible for developing a bicycle system in the unincorporated area, and has also assumed the responsibility for coordinating and promoting the development of intercity bicycle facilities of countywide significance in the incorporated area.

COUNTYWIDE RESPONSIBILITIES

In the unincorporated area, the Orange County Road Department has traditionally been responsible for transportation facilities; the Harbors, Beaches and Parks District has been responsible for the administration and development of recreation facilities; and the Planning Department has been instrumental in long range planning

for certain recreation facilities such as riding and hiking trails, and regional parks. Since the bicycle is both a recreation and transportation vehicle, it is necessary that these three County departments, plus the Orange County Flood Control District, coordinate in the planning and development of the countywide bicycle system in the unincorporated area and with the cities in the incorporated area. Administration and maintenance of bicycle facilities, both local and countywide, in the unincorporated area within road rights-of-way is the logical responsibility of the Road Department. Facilities outside road rights-of-way and facilities within parks are the responsibility of the Harbors, Beaches and Parks District, with the exception of those responsibilities shared with the Flood Control District, with the exception of the Flood Control District's responsibility for facilities located on Flood Control property. Responsibility for implementing unincorporated local routes not on Road or Flood Control rights-of-way could be assigned to County Service Areas.

The Road Department has been actively engaged in, and should continue the implementation and maintenance of both local and countywide bikeways within road rights-of-way in the unincorporated area. With regard to scenic highway plans, as these plans are implemented, the Road Department is responsible for continuing implementation and maintenance of bikeways within scenic highway corridors. In addition, the Road Department should become involved in cooperative countywide projects on city rights-of-way.

The Harbors, Beaches and Parks District is charged with the responsibility for (1) the administration of countywide funds other than Flood Control and Road funds for the construction and maintenance of countywide bikeways outside road rights-of-way in the unincorporated area, and (2) the administration of these funds in the incorporated area to be used to match city funds for the implementation of the Master Plan of Countywide Bikeways. The Harbors, Beaches and Parks District would not be responsible for the maintenance of bikeways within cities.

The Flood Control District has the primary responsibility for implementing bikeways within the District's many countywide rights-of-way. The Flood Control District may also engage in cooperative projects with other agencies and the cities. The present Santa Ana Trail project is their priority bikeway effort, and has been financed with County General Funds and a \$50,000 Federal Grant. For anyone who has explored the finished portion of the bicycle trail between Atlanta Avenue and Edinger, there is little doubt that the effort is well directed and highly productive. When the trail is completed in the near future, it will surely be an Orange County landmark and one of the most significant bicycle trails in the nation.

The Planning Department is responsible for continued support in the development of the countywide bikeway system. Although not charged with any administrative function, the Planning Department will cooperate with other departments and agencies and will act in a coordinating, evaluating, and information gathering capacity. The Planning Department is responsible for the preparation of the Master Plan of Countywide Bikeways, the processing of amendments, and for the overall integration of bikeway plans with other general plans, especially the following:

1. Master Plan of Arterial Highways
2. Interim Open Space and Conservation Elements
3. Master Plan of Regional Parks
4. Master Plan of Local Parks
5. Master Plan of Riding and Hiking Trails
6. Santa Ana River/Santiago Creek Greenbelt Plan
7. Master Plan of Scenic Highways
8. Master Plan of State Scenic Highways

CITIES' RESPONSIBILITIES

City departments are certainly the best equipped authorities to administer the implementation of their own local bikeway systems and the countywide bikeways within their boundaries. Instrumental in fulfilling this charge is the establishment of good channels of communication with other cities and with County departments. City officials are responsible for determining

the relationship between their proposed bikeways and the countywide system, and assisting in evaluating the applicability of County matching funds to projects in the incorporated area, remembering that routes which are included in or can be subsequently amended to the countywide master plan are eligible for matching funds. Other sources of bikeway funding should also be explored by city governments.

MAP

Pictured on the enclosed map are the bike-way routes comprising the transportation and recreation networks of the countywide plan. Changes and additions to this plan are inevitable and are requisite for the ultimate development of the best possible County bicycle plan. The accompanying index of routes can be used with the map for closer examination of specific routes.



7 STANDARDS AND CRITERIA

(HOW TO BOOST A BIKEWAY, SLIM DOWN A SLOPE AND TAILOR A TRAIL)

Standards pertaining to bikeways can be divided roughly into two categories: route selection, and construction design. Construction design standards are most applicable to the final implementation phases of development, while route selection criteria relate more to the planning process. Obviously, there are many choices within each category. Making the correct decisions in each category is critical to the ultimate public acceptance and overall utility of the bikeway. Attempts were made in the initial development of the skeletal system to propose routes that could comply generally with these basic criteria. The following design concepts are presented as potentials and as general considerations to be elaborated upon during a later phase of development. Several significant references were utilized in this analysis; one which merits mention is the State of California Division of Highways publication, Bikeway Planning Criteria and Guidelines. It is hoped that the County Road Department will continue, as they have already begun, to develop additional specific design standards for bikeways in Orange County.

ROUTE SELECTION CRITERIA

Aesthetics: The aesthetic value of a bicycle route is a highly subjective and often personal criterian, but one which is closely related to achieving maximum usage and enjoyment. While it applies most critically to recreational routes, there is an increasing trend toward coordinating transportation and aesthetics, scenic highways being a prominent example of this concept. Ideally, bikeways should be established in areas where visual amenities and varying scenic vistas predominate, providing a

satisfying and memorable environmental experience to the bicyclist. Urban routes need not be just monotonous, indiscriminate ramblings through blank areas of the city. Unique forms of architecture, cultural and historical landmarks, and familiar physical reference points are all features which should be given aesthetic consideration. While most other bicycle facility specifications are largely quantitative, the aesthetic consideration, if negligently employed, could lay to rest an otherwise beautifully engineered route.

Length: A bicyclist's choice to utilize a particular bicycle route is strongly related to the distance he can travel along that bikeway. The average bicyclist maintains a speed of between 11 and 19 km/hr (7 and 12 mph), permitting him to cover a mile in about six minutes. A route used primarily as a recreational facility will therefore need to be lengthy enough to allow an acceptable duration of use time. In addition, a route of insufficient length will more quickly become uninteresting to many users.

A transportational route of short length will seem less attractive as the inconvenience imposed by its use becomes greater. However, a short route which circumnavigates a major inconvenience or hazardous area will likely enjoy great popularity in spite of its brevity.

Ideally, bicycle routes should not exist as linear segments, but should be incorporated into continuous networks and sub-networks. The County Master Plan is based on this concept. Consequently, length becomes a design consideration primarily in a youthful network.

Grade: Many bicyclists may be deterred from using a bikeway in direct proportion to the energy expenditure demanded by the route. Although bicycles vary considerably grade is still the design factor most affecting the work required to negotiate a given bikeway. General grade design guidelines should, therefore, be adopted and applied whenever possible in the selection of potential routes. But more than grade alone, it is the effect of grade and length that tires the bicyclist. A 15 meter length (1 meter = 3.3 feet) of steep grade may trouble no one, while the same grade for a half mile would impose a formidable obstacle.

Studies seem to indicate that a maximum recommended grade for general bicycling is about 5%. For this grade the maximum grade length should be less than 50 meters. (Figure 2). Where grades in excess of recommended limits are unavoidable, such as on some existing rights-of-way, the route can be broken into shorter, acceptable grade lengths by the use of brief, level stretches and areas suitable for stopping and resting.

GRADE AND LENGTH CRITERIA - FIGURE 2

GRADE	MAXIMUM RECOMMENDED LENGTH
10.0%	20 meters
5.0%	50 meters
4.5%	100 meters
4.0%	180 meters
3.5%	250 meters
3.0 %	300 meters
2.5%	400 meters
2.0%	500 meters

With the continuing mechanical improvement of bicycles, as well as the near-certainty of increasing human physical capabilities, perhaps it is wise to view grade limits as an important, but somewhat flexible criterian. Better a steep trail with frequent rest stops than no trail at all.

Accessibility: In the early stages of a developing bicycle route system, a particular bicyclist may have to travel some distance over unprotected city streets to gain access to the relative safety of the system. As the web grows, however, its design should bring it to virtually every doorstep. The many local networks in the system can be further abetted by neighborhood networks, perhaps just a signed street which leads into the larger network. The local networks are joined to other local networks; cities are linked. When transportational networks are joined to the recreational routes, the accessibility by bicycle of countless places of interest - the 26 cities, residential areas, beaches, parks, educational facilities, shopping centers, cultural centers, industrial areas - becomes a highly useful reality.

CONSTRUCTION DESIGN CRITERIA

Design Speed: The speed at which a bicyclist will travel is dependent upon many factors which include the type of bicycle, and the physical condition of the bicyclist. Studies have shown that the average speed of unconstrained bicyclists is about 16 kilometers per hour (10 mph). This design speed has been accepted as a fundamental parameter upon which such additional standards as radius of curvature, surface, width, and safety features are predicated. Design speed may be flexible in some situations when it is apparent that either a higher or lower speed of bicycle travel will predominate.

Width and Direction: The minimum width to allow safe passage of single file bicycle traffic is the actual width of bicycle and rider, plus an allowance for maneuvering. An additional separation from lateral obstructions is also recommended. The width of proposed bikeways is a primary consid-

eration involving the cost and the very feasibility of the facility, as well as its ultimate utility. It is both a planning consideration and an engineering standard, and one for which the following recommendations are given.

The minimum desirable width for one lane of one way bicycle traffic, including exterior maneuvering space, has been determined to be one meter (3.3 feet). (This does not include the additional .25 meter (.8 feet) recommended lateral clearance on each side of the facility). While this may be considered an absolute minimum, it is also important that bicyclists generally prefer to ride two-abreast. Considering a small additional interior maneuvering space, a width of 2.4 meters (7.7 feet) is the calculated minimum to accommodate two lanes of one-way bicycle traffic. For the sake of simplicity, and to provide a greater margin of safety, it is the standard of the County that 1.2 meters (4 feet) be used as the minimum design width for each bicycle lane, and that at least two lanes be utilized wherever possible. Where two such lanes absolutely cannot be utilized, a 1.8 meter (6.0 feet) width will provide a single-lane, one-way bikeway with a minimum passing clearance.

According to California State Law, bikeways which share the roadway with motor vehicles cannot accommodate two-way bicycle traffic. Even with physical separation from automobile traffic, studies have shown that two-way bicycle traffic on relatively narrow paths is a source of accidents and not preferred by bicyclists. When the two-way bikeway must negotiate an intersection with motor vehicle traffic, the problem is further multiplied. There is, however, a cost factor to consider, as well as the physical problem of implementing two separate trails.

In cases of trails completely distinct from road rights-of-way, such as the Santa Ana River Trail, there is considerable evidence of success. It is recommended, however, that where a trail is designed as a two-way facility, the maximum feasible width be utilized, and some means of indicating the two directions of traffic be included.



A final consideration which may be of much importance is the possible operation of construction and maintenance vehicles on bicycle trails and ways. This factor alone may be the strongest argument for a relatively wide minimum width standard.

Surface: Where bikeways are developed within existing road rights-of-way it is likely that the surface material will be the same as for the roadway. For some proposed trails, however, an independent selection of surface materials may be required. The basic structural criterian for a bikeway surface is that the material be adequate to support the wheel loads of bicycle and rider, as well as any maintenance vehicle that may use the facility. Of the dozen or so materials considered, hot mix asphalt pavement appears to be superior in overall feasibility. This material is relatively inexpensive in both construction and maintenance costs, and it is commonly used for many other purposes throughout the state. The required thickness of asphalt varies, depending on the quality and depth of the subgrade, from about 3.8 centimeters to 15 centimeters (1 1/2 to 6 inches). Concerning construction costs, it may be less expensive to install a wider trail by machine than a narrower one by hand.

On the other end of the spectrum of surface materials are the more natural stabilized earth, stone chip, and soil cement systems. Such systems as these are generally undesirable, since they are a poor running

surface for bicycle tires, and a recurring maintenance problem. It is doubtful that the low initial cost of these surface treatments would ultimately represent an advantage.

Hazards: There exists a class of objective bicycle hazards which seem distinct from the category of general safety. Of these hazards, the presence of storm drainage grates on bicycle routes is noteworthy. These slatted structures can entrap a narrow bicycle wheel and cause serious injury to bicycle and rider. Proposed bike-ways should be designed with alternative

bicycles could drastically reduce the frequency of bicycle theft. With the exception of schools and some public buildings, bicycle parking facilities in large cities are almost non-existent. While such public open spaces as parks and plazas can provide parking sites, private businesses adjacent to a bikeway should be encouraged to participate in providing parking facilities. Private lots might utilize marginal spaces for bicycles. About 14 bicycles can be parked in the space required by one car! Not just space, but the use of a secure parking device is integral to adequate bicycle parking. Almost any device which



drainage structures. Existing facilities are more difficult to deal with. Warning signs could lead to legal problems in the event of liability claims. The best solution is probably the piecemeal replacement of these storm grates as soon as possible with an improved design when they occur on a heavily traveled bicycle route, and this course of action is strongly recommended.

Theft: In most American cities bicycle theft has increased dramatically in recent years. The offenders are both neophytes and professionals. This upsurge represents a real hazard to all bicycle owners. Inherent in any mature transport system is a requirement for parking facilities. Cities commonly have many types of automobile parking facilities, the trend being toward the security guarded lot or garage. Some form of security parking arrangement for

involves locking the bicycle frame, and if possible the wheels, to a stationary fixture will suffice. The stronger the materials, the better. Bicycle lockers, probably the most secure system, are presently being considered by the Orange County Transit District for incorporation into their planned terminal parking facilities. Most systems however, require the bicyclist to carry a lock for attachment. There is much room for innovative design in this area and encouragement is offered.

SAFETY

By and large, the relative safety of bicycle trails and ways is a function of design. Furthermore, the safest and most preferred design is a trail completely distinct from a road right-of-way. As the

bikeway interface with motor vehicle traffic increases, the inherent safeness of the system diminishes. Unfortunately, the completely separated trail is only feasible where other linear rights-of-way are available and where cost is not a limiting factor. The most important safety considerations for such trails are: adequate width and control of traffic directions, safe clearances to the sides and above the pavement, sufficient sign designation of unsafe or potentially hazardous areas, and signalization and night lighting if necessary.

Next in inherent safeness is the trail which parallels a road, but is physically separated from the motor vehicle traffic except perhaps at crossings and intersections. This alternative includes utilizing sidewalks, in which case a pedestrian-bicycle conflict is introduced. The best shared sidewalk designs generally require widening and some type of delineation of pedestrian and bicycle zones. (Figure 3). The grade separation between road and sidewalk is a primary determinant of the relative safety en-

joyed by this type of facility. At intersections this advantage can be preserved only by utilizing some type of over or underpass design. Such systems are successful in England and in Davis, California.

FIGURE 4

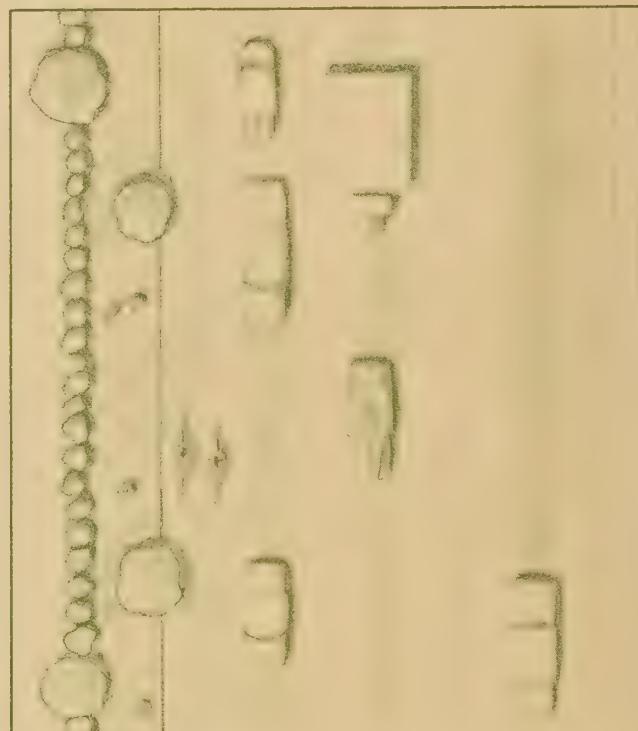
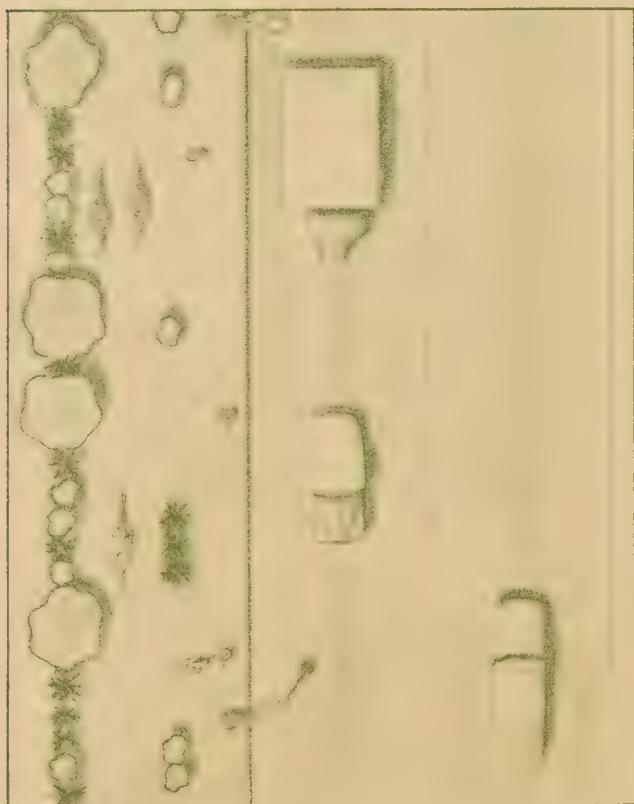


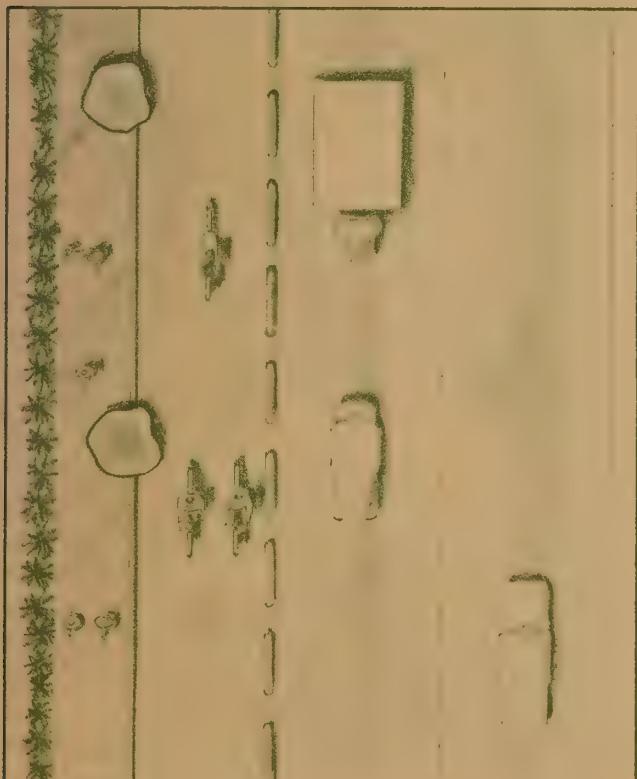
FIGURE 3



Incorporating the bikeway with the roadway provides more possibilities than with the sidewalk, but requires more careful consideration as the conflicts both from parked cars and moving vehicles pose more serious consequences to the bicyclist. On feeder streets and arterial highways where traffic is heavy and the speed differential between cars and bicycles great, physical separation is strongly recommended. (In France, the National Highway Safety Council has concluded that physical barriers should be provided for all bikeways that are immediately adjacent to traffic lanes.) An interesting alternative to a constructed barrier is placing the bicycle trail between the parking lane and the curb. Here the parked cars act as a barrier. (Figure 4). The most significant shortcoming occurs when rapid parking turnover creates

heavy pedestrian cross traffic. And again, intersections pose a problem. Where use of the parking lane separation is impossible some other type of barrier is recommended to reduce the cross-penetrability of the bicycle trail. Such physical means as berms, islands, fences, and median strips can all be employed. (Figure 5). While the physical is preferred, a symbolic barrier such as paint striping is sometimes the only feasible alternative. On streets with relatively light traffic, striping may be an adequate measure when used in conjunction with effective signing.

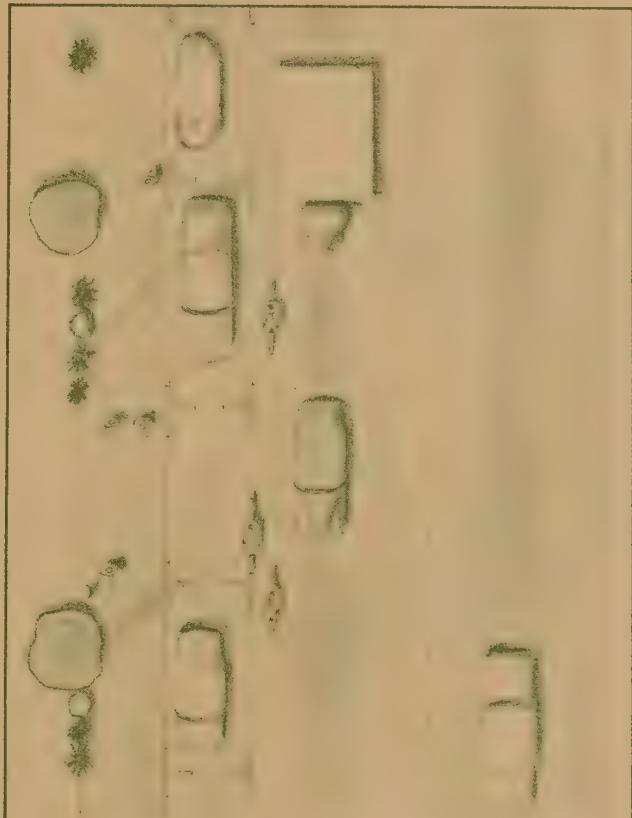
FIGURE 5



The minimum bicycle way design, employing only signs and much faith, should be avoided except in cases where circumstances will allow no other alternative. (Figure 6). On quiet residential streets a sign may seem to provide the only facility necessary, but it should be born in mind that the results of a recent study in Los Angeles County indicate that most bicycle/

motor vehicle accidents occur in residential areas (55%), as opposed to business districts (42%).

FIGURE 6



Another finding of the Los Angeles study faults, directly or indirectly, the bicyclist as cause of the majority of mishaps involving motor vehicles. While the incompatibility of cars and bicycles is a fact, the two modes presently, and for a time to come, are probably doomed to frequently sharing rights-of-way. Therefore, an emphasis on bicycle safety education by all involved agencies is highly recommended. The County Sheriff should accept this responsibility for the unincorporated area. Cities should provide bicycle safety programs in their schools. While increasing the awareness of bicyclists to the laws and regulations regarding bicycle travel, a more serious effort should be made by law enforcement agencies to enforce these rules, both for bicyclists and motor vehicle operators.

8 DEVELOPMENT OPPORTUNITIES

(PEDAL PUSHING)

Orange County has an intricate grid of rights-of-way for motor vehicles, trains, and conduits for water, gas, electricity, communication, and sewage. And yet, the greatest barrier to the creation of bicycle routes is obtaining the use of linear strips of land, particularly in urban areas.

Bicycle routes can be located through parks, along abandoned railroad rights-of-way, next to canals and rivers, on utility company easements, on private property easements, within existing road rights-of-way, and by acquiring additional road rights-of-way for construction of bikeways physically separated from motor vehicle traffic. Almost any reasonably level stretch of land traversing some distance can be viewed as a potential route.

Bikeway implementation, unless solely utilizing flood control or utility company facilities or within road rights-of-way, will require acquisition of land or development rights. Public acquisition in fee simple of all property rights, which guarantees full public control and use, is desirable for most major public use facilities which would accommodate bicyclists. This is also applicable to the more important route corridor areas where conflicting development may threaten to foreclose opportunities to establish bikeways. Purchase and leaseback arrangements might be appropriate along some route segments. The facility could thus be protected and at the same time the previous landowner could continue to pursue activities compatible with the bicycle use. In addition, scenic or conservation easements would in many cases suffice to protect scenic values along the bikeway. These could be especially applicable in scenic highway corridors.

WATER COURSES

In Orange County, flood control channels and river banks provide excellent opportunities for bicycle trail development. Flood control levees and service roads built along flood control channels present an ideal opportunity to develop minor bicycle transportation trails for local community systems. Unfortunately, these facilities present problems which decrease their effective use as part of larger bicycle networks. In urban areas, these facilities avoid secondary and residential streets, but are interrupted by major and primary arterial highways where bicycle crossing would be hazardous. In some cases extra efforts should be made to provide access from local residential areas. In the case of open flood control channels, fencing may also be required to separate bicyclists from the actual channel. Rest areas and special points of interest along the route could enhance considerably the quality of such bikeways.

Perhaps the best opportunity in Orange County for the development of a bicycle trail is the river banks and levees of the Santa Ana River. The Santa Ana River-Santiago Creek Greenbelt Plan proposes a "...linear greenbelt, linking park nodes and significant open spaces, with channel and riding-hiking-bicycle trails as a spine." Since the river does cut through urban areas, it provides a particularly good recreational opportunity for the urban population of Orange County. At this time, construction has been completed from Huntington Beach to Edinger Street in Santa Ana. As the river channel becomes distorted near its outlet to the sea, the route traverses city streets for the last few miles to the beach; the implementation costs for this segment were shared by the city of Huntington Beach and the County. Continued construction will extend the asphalt trail at least to Lincoln in Anaheim in 1973,

and hopefully, to the County boundary the following year. The Santa Ana River is a prime factor in the countywide plan, linking many cities, recreation areas, and points of interest. Problems involved with its use would be centered around safety, and compatible use of the levees and river banks by both equestrians and bicyclists.

UTILITY EASEMENTS

Another opportunity for bicycle trail development is the utility company easement. The primary shortcomings of this potential bicycle right-of-way are related to the generally mixed ownership common to this type of land. Most such easements are established specifically for utility rights, and to provide a bicycle trail would require acquisition of additional rights from each owner.

On the positive side is the opportunity to provide a bicycle trail separate from motor vehicle traffic but still accessible to users. Utility easements almost always intersect public streets frequently enough to provide adequate access. Extensive linear easements, such as high power transmission lines, present potential large-scale non-motorized transportation corridors. Construction costs are likely to be reduced because of existing maintenance practices which usually include land clearing. Certain restrictions, however, may be superimposed by the specific requirements of the utility.

RAILROADS

The fact that a railroad company, as a rule, is the single owner of its right-of-way gives this alternative an apparent advantage over the mixed ownership right-of-way. Also, the abandoned railroad corridors are generally less dissected by streets and usually do not require special barrier construction. Grades are well within the range recommended for bicycle travel; and the general nature of a railroad right-of-way lends itself well to the design criteria for bicycle trails, with surfacing the only remaining major construction requirement.

The major disadvantage of abandoned rail-

road rights-of-way is the considerable expense generally associated with the purchase of the wide, linear property when only a narrow 3 or 4 meters (10 or 12 feet) portion is really required. Thus, it seems desirable to either negotiate a small linear easement, or to purchase the entire right-of-way and develop it for multi-use purposes. Several beach front railroad rights-of-way have been abandoned, including Pacific Electric Railroad lands between Seal Beach and Huntington Beach, and Southern Pacific's tracks from Newport Beach to Huntington Beach. Southern Pacific Railroad has also abandoned a right-of-way between Lincoln Avenue in Villa Park and Main Street in Tustin. At present, this right-of-way is scheduled for acquisition with Revenue Sharing Funds in the near future.

STREETS AND HIGHWAYS

The County has spent millions of dollars for highway construction, but has made little provision for bicycling on these highways. Roads provide a multiplicity of opportunities for bicycle facilities both in the form of physically distinct trails and the more easily implemented bicycle ways. Road rights-of-way are generally wide enough to accommodate at least a minimum bikeway without additional land acquisition, and ownership is usually public. As determined in the feasibility study for the County bicycle plan, Highway User's Fund monies may be used to finance bicycle facilities when they occur within the right-of-way.

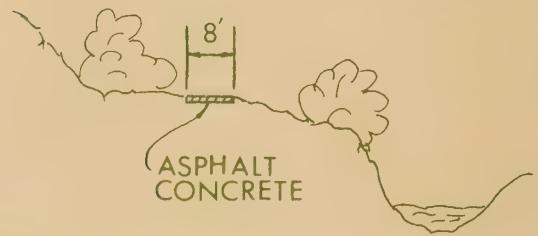
Proposed highways are presently being designed with considerations other than motor vehicles in mind. State code prescribes that bicycle facilities be included in the design of new freeways and in the widening of existing freeways if such routes and facilities are included in the master plans of local jurisdictions. Design costs and land acquisition costs, normally the most expensive development factor, would be born by the state.

The Orange County Road Department has developed new typical sections for arterial highways which include a parkway strip

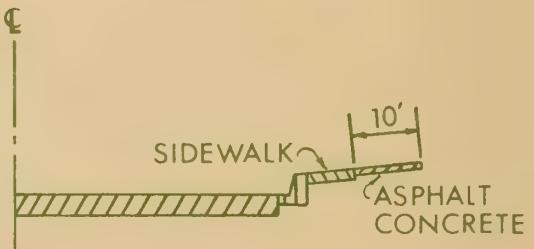
of liberal width to accommodate a safe and aesthetic parkway bicycle trail on both sides of the traveled way (Figure 7). This design innovation will be applied to scenic highway construction and improvement projects wherever feasible.

In addition the Road Department is studying areas of conflict between bicyclists and motorists, refining design standards including intersection considerations and traffic controls, and cooperating with the Orange County Traffic Engineers' Council on many aspects of bikeway systems.

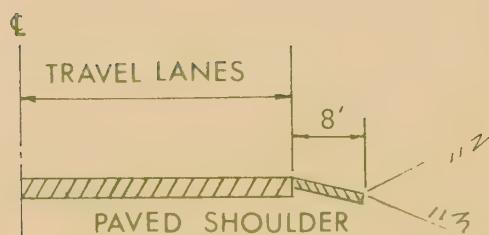
When master plan routes are designated to parallel proposed roads it is intended that any subsequent alignment changes to the road would apply concurrently to the bikeway.



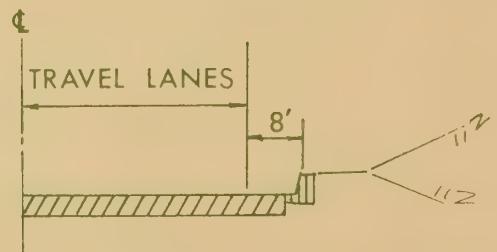
OFF ROAD - ULTIMATE



**OFF ROAD - ULTIMATE
TWO-WAY
ONE-SIDE**



**SIGNED & STRIPED
INTERIM
ONE-WAY
BOTH SIDES**



**SIGNED & STRIPED
INTERIM OR LOCAL
ONE-WAY
BOTH SIDES**

9 COSTS AND FUNDING (IT WON'T BE A STYLISH MARRIAGE)

COSTS

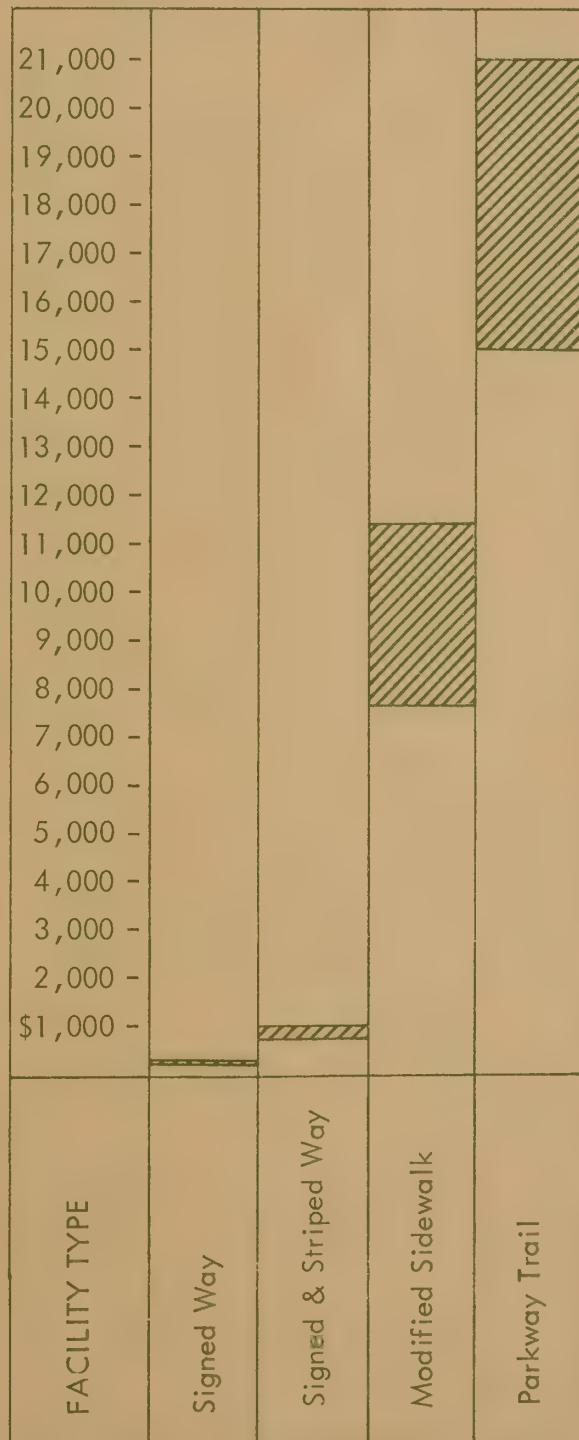
Costs for establishing bikeways can be grouped into several categories. If land acquisition is required, it is usually the largest single expense and can easily be greater than the sum of all other expenses. According to Orange County Road Department estimates, the average purchase price of a linear kilometer of land for a bicycle trail 2 1/2 meters (8 feet) wide would be approximately \$18,600 (\$30,000 a mile).

Construction costs are determined largely by the design of the facility. For the simplest bicycle way, involving only signs, costs are merely those of the signs and their installation - about \$217 a kilometer (\$350 a mile). Adding a 7 1/2 centimeter (3 inch) stripe increases the expense by about \$310 a kilometer (\$500 a mile). As the sophistication of the facility increases, so does the cost. Estimates shown in Figure 8 are approximate ranges and include all necessary expenditures for the facility type except for land acquisition, landscaping, and maintenance.

But even the relatively high cost of establishing a parkway trail along an arterial highway is dwarfed by the cost of road construction. One mile of typical freeway costs about ten million dollars, enough money to build a 2 1/2 meter (8 foot) asphalt bicycle trail from Orange County to Portland, Oregon, or establish a bicycle way to the North Pole!

While any detailed cost analysis for implementing the entire bikeway master plan would be a difficult task, rough estimates can be constructed from available data and a few assumptions. Of a total proposed countywide bikeway system of about 731 kilometers (457 miles), about half lies within the unincorporated area. Crude analysis and conjecture lead to the conclusion that within the cities about two-thirds of the countywide routes will be im-

RANGE OF BIKEWAY COSTS PER MILE FIGURE 8



plemented as the less expensive bicycle way design and one-third will be bicycle trails. This estimated ratio is assumed to be reversed for the unincorporated area. An average construction cost exclusive of acquisition, landscaping, and maintenance - for a bicycle trail such as the Santa Ana River Trail is about \$7,440 per kilometer (\$12,000 per mile), while an average cost for the simple, signed and striped bicycle way is assumed to be about \$620 per kilometer (\$1,000 per mile). When these costs are applied to the mileages according to the assumed ratios, a total cost can be calculated. In addition, it was also assumed that all countywide bikeways within cities would be 50 percent financed by the cities. According to this process - given certain data and assumptions - the cost to the County of implementing the Master Plan of Countywide Bikeways would be in the neighborhood of 2.4 million dollars. This estimate, as was stated, does not include acquisition, easement or leasing costs, expressing the view that the use of public rights-of-way will dominate the system. Nor does it include landscaping and maintenance costs.

Based on the above estimate and on the County's participation to date (see Figure 10), the entire system could be implemented within about 12 years.

To be assured of the most accurate estimates of construction costs for proposed bicycle facilities, contracting costs should be obtained locally and projects examined and appraised individually. There is presently much room for innovation, both in design and construction of bikeways.

FUNDING

On first sight, the possible sources of money for the establishment of bicycle facilities may seem somewhat obscure and limited. However, research into the matter reveals a surprisingly rich selection of choices from which to draw. Foremost among the possibilities is internal money-funds budgeted from the County General Fund or special recreation district funds. Substantial amounts of County funds have been released already for bicycle trails and ways. Adoption of the original bicycle feasibility

report was accompanied by an allocation of \$100,000 of County funds. In the following fiscal year (1972-1973) \$200,000 for bicycle facilities was appropriated from the General Fund. \$100,000 of Revenue Sharing Monies was authorized for expenditure during the 1973-74 fiscal year. In the current fiscal year (1974-75) \$400,000 was appropriated from the Harbors, Beaches, and Parks District Fund for bicycle trail construction.

The establishment of a County Environmental Enhancement Fund, using additional revenue received as a result of Senate Bill 325, provides still another possible source of bicycle funds. Set aside for transportation-oriented environmental projects, none of the County's \$130,000 share for the fiscal year 1972-1973 has yet been earmarked specifically for bicycle facilities, though it is eligible. This source of funding, because of its allocation being based on revenue collected in the unincorporated area, should not be committed for city projects.

Senate Bill 821, which was passed in 1973, requires that up to two percent of the funds allocated for transportation in Senate Bill 325 are to be made available for cities and counties for pedestrian and bicycle facilities. Up to \$3.2 million can be provided yearly for a local transportation planning agency.

Another internal source is provided by the Highway User's Tax Fund, administered through the County Road Department. Senate Bill 36 allocated a minimum of \$360,000 annually for the construction of bicycle facilities along the State Highway System, and \$30,000 per month from the Highway User's Tax collected for cities and counties for the construction of bicycle lanes along local streets and roads.

Federal Grants comprise a major external possibility for the funding of bicycle projects. Several federal programs have been found to be applicable. (Figure 9). Already a grant of \$50,000 has been awarded to the County through the Land and Water Conservation Fund. The money received was matched by County funds of \$87,000 and is being used for the continuation of

the Santa Ana River Trail project. It is hoped that continued efforts to obtain federal cooperation can be met with similar success.

The Federal Aid Highway Act of 1973 authorized the inclusion of separate or preferential bicycle lanes or paths on Federal Aid Highway Projects to the sum of \$40,000,000 in total or \$2,000,000 per fiscal year by each state.

A variety of less likely means for acquiring bicycle facility funds are available to the innovative...

CITY FUNDING

Many of the same possibilities already discussed for acquiring funds to implement bikeways apply equally, or at least in part, to the cities. In addition, County money has been made available to the cities on a fund matching basis for implementation of bicycle routes within a city but included in the countywide plan. City routes that are judged to be of countywide significance but are not a part of the proposed County system can be added by amendment to the County plan, thereby making them eligible for matching funds. Several requests for matching funds have already been expedited and others are expected and welcomed.

BRIGHT OUTLOOK

The present status of bicycle facility financing for Orange County is quite favorable. (Figure 10). It is hoped that the ever-improving coordination between agencies and between cities and the County will lead to the wise utilization of all presently available funds. As the need for bicycle facilities becomes more and more of a reality, sources of funds are likely to become more diverse. The present outlook is bright. It is surely the desire of all concerned that Orange County's bicycle plan be taken from the drawing boards and put into the County. Bicycle rental concessions could be expanded with a portion of the profits going to a bikeway fund. Some percentage of the permit fee could be similarly directed. The relatively fixed income from the bicycle rental operation seems especially

suited to a maintenance cost application. Such concessions presently exist at Irvine and O'Neill Parks and are planned for Featherly Regional Park. The County's present income from this source is small but could be increased as has been accomplished in other parts of the country.

Bicycle license fees, or a portion thereof, could be applied to implementation and maintenance costs of a bikeway system. Registration could be enforced and the fee regulated to yield a higher revenue.

Park fees for entrance and parking at recreation areas could provide a percentage to offset the cost of establishing and maintaining bicycle facilities.

Fines and Forfeitures resulting from traffic violations amounted to over 2 million dollars in 1971. This revenue is presently divided between the County General Fund and the Road Department. A percentage of this income could justifiably be directed toward bicycle system needs, especially that portion of revenue resulting from violations of more stringently enforced bicycle regulations.



BIKEWAY BALANCE SHEET - FIGURE 10

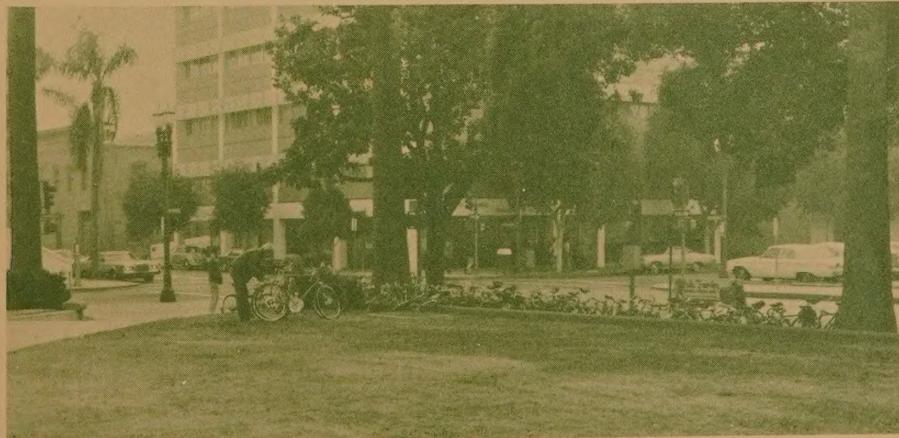
\$ Budgeted	Source	\$ Spent	\$ Encumbered	\$ Unexpended
<u>1971-72</u>				
100,000	County General Fund	9,100	62,500	28,400
<u>1972-73</u>				
200,000	County General Fund	---	87,000	113,000
80,000	Road Department	80,000	---	0
50,000	Federal Grant	---	50,000	0
130,000	Environmental Enhancement Fund	---	---	130,000
<u>1973-74</u>				
121,000	Federal Revenue Sharing Funds	23,925	76,750	20,325
11,900	Road Department	11,900	---	0
171,000	Flood Control District	171,000	---	0



10 AFTERTHOUGHT

The regional bicycle route system is not an independent concept. It is unquestionable tied to numerous other planning considerations. Related activities are impacted by both the recreational orientation and the transportational nature of bicycle trails and ways.

Perhaps the bicycle is beckoning the dawn of a new age, not a regression to the time when roads were built for bicycles and there were no cars, but the beginning of a more liveable world where people are truly free - free of needless dependence on the automobile, free of air pollution alerts and oil spills, free of the need for diets and tranquilizers, free to enjoy the untainted beauty that is their world.



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ORANGE COUNTY PLANNING DEPARTMENT
H. G. Osborne, Interim Planning Director
Bill Olson, Interim Program Administrator

PLANS DIVISION
Al Bell, Principal Planner

GENERAL PLANS SECTION
James T. Tso, Senior Planner

PARTICIPATING STAFF
Timothy S. Neely, Project Director
James Eisenhard*
James Funk*
Laurel Kuntz

GRAPHICS
Wayne Curl
Trudy MacDonnell
Pat Riach
Fredaline Strand

* Resigned prior to plan adoption.

